

Level Measurement

Continuous level measurement

Controllers / SITRANS LT500 - HydroRanger / MultiRanger

Overview



SITRANS LT500 is a versatile, single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.

Benefits

- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications.
- English, German, French, Spanish, Chinese, Italian, Portuguese, Japanese, Danish, Dutch, Swedish, Finnish, Polish, Russian, and Korean texts on the HMI.
- Removable terminal blocks for ease of wiring.
- Digital input for back-up level override from point level device.
- Communication options for HART, Modbus RTU, PROFIBUS PA, PROFIBUS DP, and PROFINET.
- Single or dual point level monitoring.
- Auto False-Echo Suppression for fixed obstruction avoidance.
- Up to 6 independent programmable relays for pump control, alarms, or remote totalization.
- Level, volume, and flow measurements in open channels, differential control, extended pump control, and alarm functions.
- Wall, panel, and remote panel mounting options.
- Remote configuration via EDD with SIMATIC PDM and SITRANS DTM via USB.
- MCERTS Certified for open channel flow.

Application

SITRANS LT500 mA HART version can be used with SITRANS LR110, LR120, Probe LU240 or any level device generating a mA signal. The ultrasonic version can connect any EchoMax or legacy transducer. SITRANS LT500 offers true dual point monitoring and digital communications. SITRANS LT500 is low maintenance and economical. With its advanced control functions, it can operate pumps during lower cost time periods and manage pump rosters for efficiency.

SITRANS LT500 will monitor open channel flow and features advanced relay alarming and pump control functions as well as volume conversion.

- Key Applications: wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage

Design

SITRANS LT500 is available in wall, panel, or remote panel mounting options.

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Selection and ordering data

SITRANS LT500 mA Hart version Continuous, non-contact, for liquids, slurries, and solids. Monitors level, volume, and volume flow, for virtually any application in a wide range of process industries.	Article No.																						
	7	M	L	6	0	•	•	-	•	•	•	•	•	-	•	A	A	•					
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.																							
Product type																							
HydroRanger	0																						
MultiRanger	1																						
Feature set																							
Level, volume, and flow	3																						
Level, Volume & Flow (Mcerts certified)	4																						
Sensor input type																							
4 ... 20 mA input(s)													0										
Number of measurement points																							
Single point version													A										
Dual point version													B										
Relay output																							
1 relay (1 Form A), 250 V AC													A										
3 relays (2 Form A, 1 Form C), 250 V AC													B										
6 relays (4 Form A, 2 Form C), 250 V AC													C										
Mounting, enclosure design																							
Wall mount, standard enclosure													0										
Wall mount, 4 entries, M20 cable glands included													1										
Panel mount													2										
Remote panel mount													3										
Type of protection																							
Ordinary Locations/General Purpose (Non-Ex), cCSA _{US} , cUL _{US} FM, CE, UKCA, RCM, EAC													0										
Ex rated ¹⁾													1										
Removable data storage																							
Included, (8 GB micro SD)																1							
Input voltage																							
12 ... 30 V DC																							2
100 ... 230 V AC																							3

Selection and ordering data	
Further designs	Order code
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301	Y15
Approvals	
CSA (USA & Canada)	
CSA Class I, Div. 2, Group A, B, C and D; Class II, Div 2, Group F & G; Class III	E21
Certificates	
Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements	C19
Factory certificate 2.2 (EN 10204)	C14
Communication	
4 ... 20 mA, active output, with HART	F01
Modbus RTU	F04
PROFIBUS PA	F05
PROFIBUS DP	F06
PROFINET	F07

Selection and ordering data	
Specials	
Special design	Y99
For customs, contact a local sales person. For more information please visit http://www.automation.siemens.com/aspa_app	
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

Selection and ordering data	
Optional equipment	Article No.
Tag, stainless steel, 12 x 45 mm, one text line, (max. 16 characters)	7ML1930-1AC
Barriers in a NEMA 4X/IP65 enclosure	A5E50255823
Barrier suitable for LR1xx & LU240 (STAHL: 9001/01-280-110-101)	A5E50113513
Sunshield/pipe mount plate, 304 Stainless steel	7ML1930-1GA
USB cable, 2 m (6.56 ft), standard USB-B to USB-mini B	7ML1930-1GD

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Selection and ordering data (continued)

Selection and ordering data	
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
Spare parts	
Replacement motherboard, single point, includes DC power module	A5E50113558
Replacement motherboard, dual point, includes DC power module	A5E50113557
Replacement motherboard, single point, includes AC power module	A5E50113542
Replacement motherboard, dual point, includes AC power module	A5E50113543
Replacement lid with 4 button HMI	A5E50113559

Selection and ordering data	
Replacement lid with 4 button HMI panel mount version	A5E50113560
Replacement lid with 4 button HMI remote panel mount version	A5E52897553
Replacement lid with blind remote panel mount version	A5E53276261
Retrofit kit for wall mount to panel mount version	A5E50114010
Retrofit kit for wall mount to remote panel mount version	A5E53276259
Panel mount cable extension, 2.5 m (8.2 ft)	7ML1930-1GF
Remote panel mount gasket and fastener kit	7ML1830-1PK
Replacement terminal blocks for 4 ... 20 mA input(s) sensor type version	A5E38824197
Replacement SD card	A5E50113554
HART communications module	A5E50113564
PROFIBUS PA communications module	A5E50113568
Modbus RTU communications module	A5E50113565
PROFIBUS DP communications module	A5E50113567
PROFINET communications module	A5E50113569

- 1) Available only with order code E21 and Mounting, enclosure design option 0 or 1.
 2) Available only with Sensor input type option 1.

SITRANS LT500 Ultrasonic version Continuous, non-contact, for liquids, slurries, and solids. Monitors level, volume, and volume flow, for virtually any application in a wide range of process industries.	Article No.												
	7ML60	●	●	-	●	●	●	●	-	●	A	A	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.													
Product type													
HydroRanger													0
MultiRanger													1
Feature set													
Level, volume, and flow													3
Level, Volume & Flow (Mcerts certified)													4
Sensor input type													
Ultrasonic transducer input(s)													1
Number of measurement points													
Single point version													A
Dual point version													B
Relay output													
1 relay (1 Form A), 250 V AC													A
3 relays (2 Form A, 1 Form C), 250 V AC													B
6 relays (4 Form A, 2 Form C), 250 V AC													C
Mounting, enclosure design													
Wall mount, standard enclosure													0
Wall mount, 4 entries, M20 cable glands included													1
Panel mount													2
Remote panel mount													3
Type of protection													
Ordinary Locations/General Purpose (Non-Ex), cCSAUS, cULUS, FM, CE, UKCA, RCM, EAC													0
Ex rated ¹⁾													1
Removable data storage													
Included, (8 GB micro SD)													1
Input voltage													
12 ... 30 V DC													2
100 ... 230 V AC													3

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Selection and ordering data (continued)

Selection and ordering data	
Further designs	Order code
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301	Y15
Approvals	
CSA (USA & Canada)	
CSA Class I, Div. 2, Group A, B, C and D; Class II, Div 2, Group F & G; Class III	E21
Certificates	
Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements	C19
Factory certificate 2.2 (EN 10204)	C14
Mass storage (SD card access via USB)	
Disable mass storage function with SD card (Required for USA) ²⁾	J07
Communication	
4 ... 20 mA, active output, with HART	F01
Modbus RTU	F04
PROFIBUS PA	F05
PROFIBUS DP	F06
PROFINET	F07
Specials	
Special design	Y99
For customs, contact a local sales person. For more information please visit http://www.automation.siemens.com/aspa_app	
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

Selection and ordering data	
Optional equipment	Article No.
Tag, stainless steel, 12 x 45 mm, one text line, (max. 16 characters)	7ML1930-1AC
Coaxial cable converter in IP65 enclosure	A5E53332217
Sunshield/pipe mount plate, 304 Stainless steel	7ML1930-1GA
USB cable, 2 m (6.56 ft), standard USB-B to USB-mini B	7ML1930-1GD
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-.....

Selection and ordering data	
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-.....
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-.....
Spare parts	
Replacement motherboard, single point, US comes with DC power module	A5E52897550
Replacement motherboard, dual point, US comes with DC power module	A5E52897552
Replacement motherboard, single point, US comes with AC power module	A5E52897548
Replacement motherboard, dual point, US comes with AC power module	A5E52897549
Replacement lid with 4 button HMI	A5E50113559
Replacement lid with 4 button HMI panel mount version	A5E50113560
Replacement lid with 4 button HMI remote panel mount version	A5E52897553
Replacement lid with blind remote panel mount version	A5E53276261
Retrofit kit for wall mount to panel mount version	A5E50114010
Retrofit kit for wall mount to remote panel mount version	A5E53276259
Replacement terminal blocks for Ultrasonic transducer input(s) sensor type version	A5E52897545
Panel mount cable extension, 2.5 m (8.2 ft)	7ML1930-1GF
Remote panel Mount Gasket and Fastener Kit	7ML1830-1PK
Replacement SD card	A5E50113554
HART communications module	A5E50113564
PROFIBUS PA communications module	A5E50113568
Modbus RTU communications module	A5E50113565
PROFIBUS DP communications module	A5E50113567
PROFINET communications module	A5E50113569

¹⁾ Available only with order code E21 and Mounting, enclosure design option 0 or 1.

²⁾ Available only with Sensor input type option 1.

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Technical specifications

SITRANS LT500 mA HART version	
Mode of operation	Level, space, distance, volume, flow, head, difference, average, totalization
Sensor input, mA HART version	
Number of inputs	1 or 2
Terminal voltage	Max. 26 V, Min. 18 V (0 ... 22.6 mA)
Wiring	2 conductor, twisted, shielded, 0.5 ... 0.75 mm ² (22 ... 18 AWG)
Max. cable length	500 m (1 640.42 ft)
Sensor input communication	<ul style="list-style-type: none"> 4 ... 20 mA HART protocol, for supported sensors: SITRANS LR110, LR120, SITRANS Probe LU240
4 ... 20 mA sensor input	
• Resolution	0.025 % of full scale
• Accuracy	0.1 % of full scale
HART sensor input	Resolution, range, and accuracy are dependent on connected sensor
Digital input	
Quantity	2
Switching threshold, low	0 ... 0.5 V DC
Switching threshold, high	10 ... 50 V DC
Input current	Max. 3 mA
Bias voltage	24 V
Analog output	
Quantity	1 or 2
Range	0 ... 20 mA or 4 ... 20 mA isolated
• Max. load	750 W
• Resolution	0.1 % of range
Accuracy	±20 µA
Startup current	3.6 mA
Fail-safe	Programmable as high, low, last reliable, set value, or hold per NAMUR NE43
Wiring	2 conductor, twisted, shielded, 0.5 ... 0.75 mm ² (22 ... 18 AWG)
Relay output	
Quantity	Up to 6, 4 form A and 2 form C
Rating	5 A at 250 V AC, 5 A at 30 V DC, non-inductive
Durability	50 000 operations min. per relay (5 A at 30 V DC, resistive load)
Fail-safe	Programmable as energized, de-energized, or hold
Wiring	Copper conductors per local requirements to meet 250 V 5 A contact rating
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature	-20 ... +50 °C (-4 ... +122 °F)
• Storage temperature	-20 ... +50 °C (-4 ... +122 °F)
• Altitude	2 000 m (6 565 ft) maximum
• Vibration resistance	0.5 g at frequencies from 10 Hz to 100 Hz
• Bump/shock resistance	25 g
Design	
Weight	

Technical specifications (continued)

SITRANS LT500 mA HART version	
• Wall mount	1.22 kg (2.68 lb)
• Panel mount	1.35 kg (2.97 lb)
• Remote panel mount	1.73 kg (3.80 lb)
Enclosure	
• Material	Polycarbonate
• Degree of protection	
• Wall mount	IP65/Type 4X
• Panel mount	IP54/Type 3
• Remote panel mount	IP65/Type 3 (front panel), IP20 (enclosure)
Display and control	
LCD display	60 x 40 mm (2.36 x 1.57 inch) LCD, 240 x 160 pixels resolution
Menu navigation	4 push button keys
Update time	1 second or less
Memory	Program and parameters stored in non-volatile Flash memory
Real time clock memory retention without power	48 hours
CPU speed	96 MHz
Memory card	8 GB Industrial micro SD
Power supply	
AC version	100 ... 230 V AC, ±15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)
Certificates and approvals	<ul style="list-style-type: none"> CE, UKCA, RCM, EAC, FM, cCSA_{US}, cUL_{US} cCSA_{US} Class I, Div. 2, Group A, B, C and D; Class II, Div 2, Group F & G; Class III Mcerts
Communication	
Service interface	USB 2.0 mini A cable
Optional Fieldbus	<ul style="list-style-type: none"> HART 7, with Active/Passive 4 ... 20 mA Modbus RTU PROFIBUS PA per profile 4.01 PROFIBUS DP PROFINET
Remote configuration via service interface	<ul style="list-style-type: none"> EDD via SIMATIC PDM SITRANS DTM via PACTware

SITRANS LT500 Ultrasonic version

Mode of operation	Level, space, distance, volume, flow, head, difference, average, totalization
Sensor input, ultrasonic version	
Number of inputs	1 or 2
Measuring range	0.3 ... 60 m (1 ... 196 ft), transducer dependent
Transducer frequency	10 ... 52 kHz
Ultrasonic transducer	Compatible transducers: all EchoMax and ST-H series transducers, legacy coaxial cable connections via converter
Accuracy	
• Error in measurement	<ul style="list-style-type: none"> Standard operation: ±1 mm (0.04 inch) plus 0.17 % of measured distance High accuracy OCM: ±1 mm (0.04 inch), within 3 m (9.84 ft) range
• Resolution	<ul style="list-style-type: none"> Standard operation: 0.1 % of range or 2 mm (0.08 inch), whichever is greater High accuracy OCM: 0.6 mm (0.02 inch), within 3 m (9.84 ft) range

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Technical specifications (continued)

SITRANS LT500 Ultrasonic version	
• Temperature compensation	<ul style="list-style-type: none"> -40 ... +150 °C (-40 ... +300 °F) Integral temperature sensor in transducer External TS-3 temperature sensor (optional) Programmable fixed temperature values
Wiring	Transducer: 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 ... 0.75 mm ² (22 ... 18 AWG)
• Max. cable length	365 m (1 200 ft)
Digital input	
Quantity	2
Switching threshold, low	0 ... 0.5 V DC
Switching threshold, high	10 ... 50 V DC
Input current	Max. 3 mA
Bias voltage	24 V
Analog output	
Quantity	1 or 2
Range	0 ... 20 mA or 4 ... 20 mA isolated
• Max. load	750 W
• Resolution	0.1 % of range
Accuracy	±20 µA
Startup current	3.6 mA
Fail-safe	Programmable as high, low, last reliable, set value, or hold per NAMUR NE43
Wiring	2 conductor, twisted, shielded, 0.5 ... 0.75 mm ² (22 ... 18 AWG)
Relay output	
Quantity	Up to 6, 4 form A and 2 form C
Rating	5 A at 250 V AC, 5 A at 30 V DC, non-inductive
Durability	50 000 operations min. per relay (5 A at 30 V DC, resistive load)
Fail-safe	Programmable as energized, de-energized, or hold
Wiring	Copper conductors per local requirements to meet 250 V 5 A contact rating
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature	-20 ... +50 °C (-4 ... +122 °F)
• Storage temperature	-20 ... +50 °C (-4 ... +122 °F)
• Altitude	2 000 m (6 565 ft) maximum
• Vibration resistance	0.5 g at frequencies from 10 Hz to 100 Hz
• Bump/shock resistance	25 g
Design	
Weight	
• Wall mount	1.22 kg (2.68 lb)
• Panel mount	1.35 kg (2.97 lb)
• Remote panel mount	1.73 kg (3.80 lb)
Enclosure	
• Material	Polycarbonate
• Degree of protection	
• Wall mount	IP65/Type 4X
• Panel mount	IP54/Type 3

Technical specifications (continued)

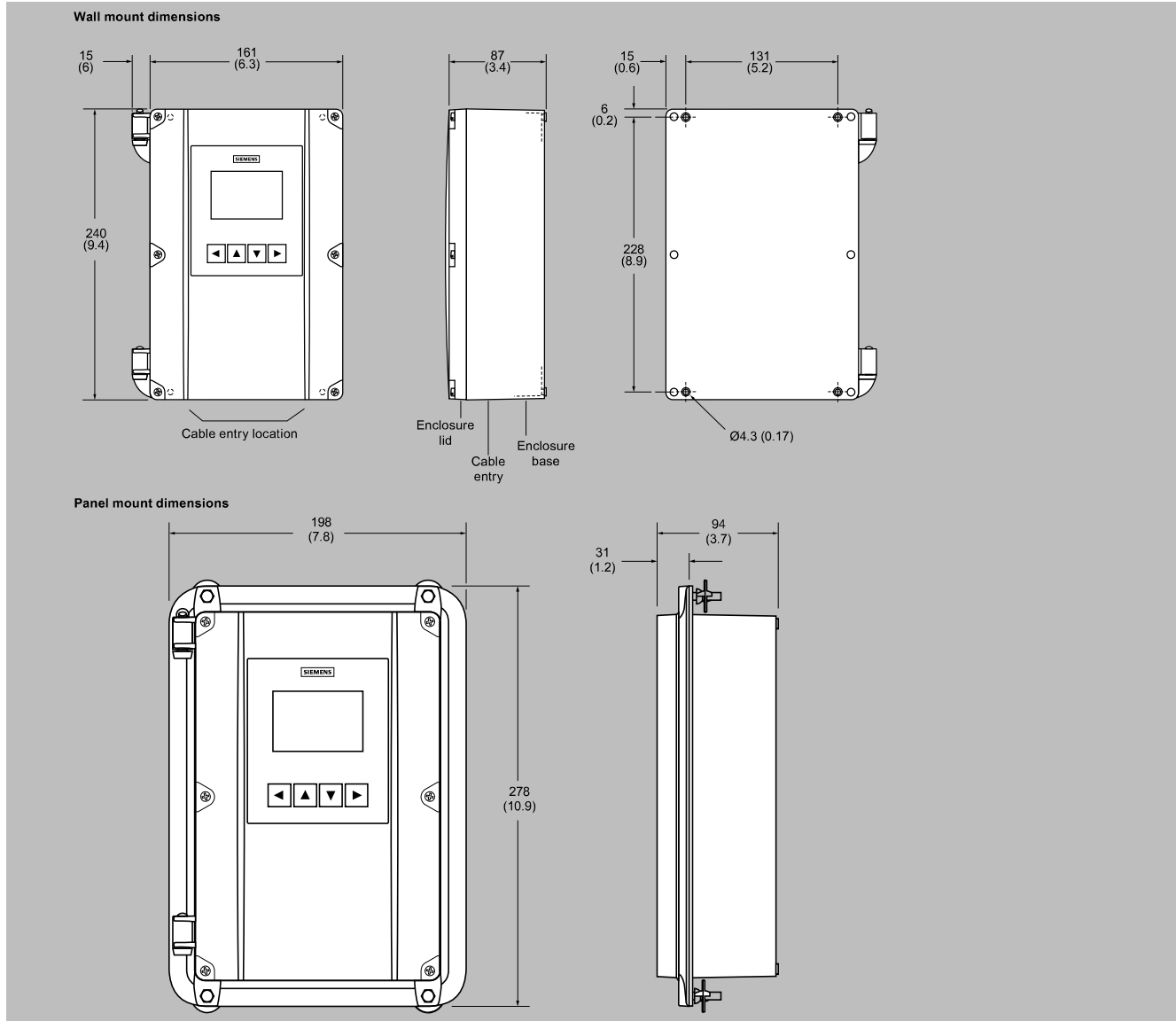
SITRANS LT500 Ultrasonic version	
• Remote panel mount	IP65/Type 3 (front panel), IP20 (enclosure)
Display and control	
LCD display	60 x 40 mm (2.36 x 1.57 inch) LCD, 240 x 160 pixels resolution
Menu navigation	4 push button keys
Update time	1 second or less
Memory	Program and parameters stored in non-volatile Flash memory
Real time clock memory retention without power	48 hours
CPU speed	96 MHz
Memory card	8 GB Industrial micro SD
Power supply	
AC version	100 ... 230 V AC, ±15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)
Certificates and approvals	<ul style="list-style-type: none"> CE, UKCA, RCM, EAC, FM, cCSA_{US}, cUL_{US} cCSA_{US} Class I, Div. 2, Group A, B, C and D; Class II, Div 2, Group F & G; Class III Mcerts
Communication	
Service interface	USB 2.0 mini A cable
Optional Fieldbus	<ul style="list-style-type: none"> HART 7, with Active/Passive 4 ... 20 mA Modbus RTU PROFIBUS PA per profile 4.01 PROFIBUS DP PROFINET
Remote configuration via service interface	<ul style="list-style-type: none"> EDD via SIMATIC PDM SITRANS DTM via PACTware

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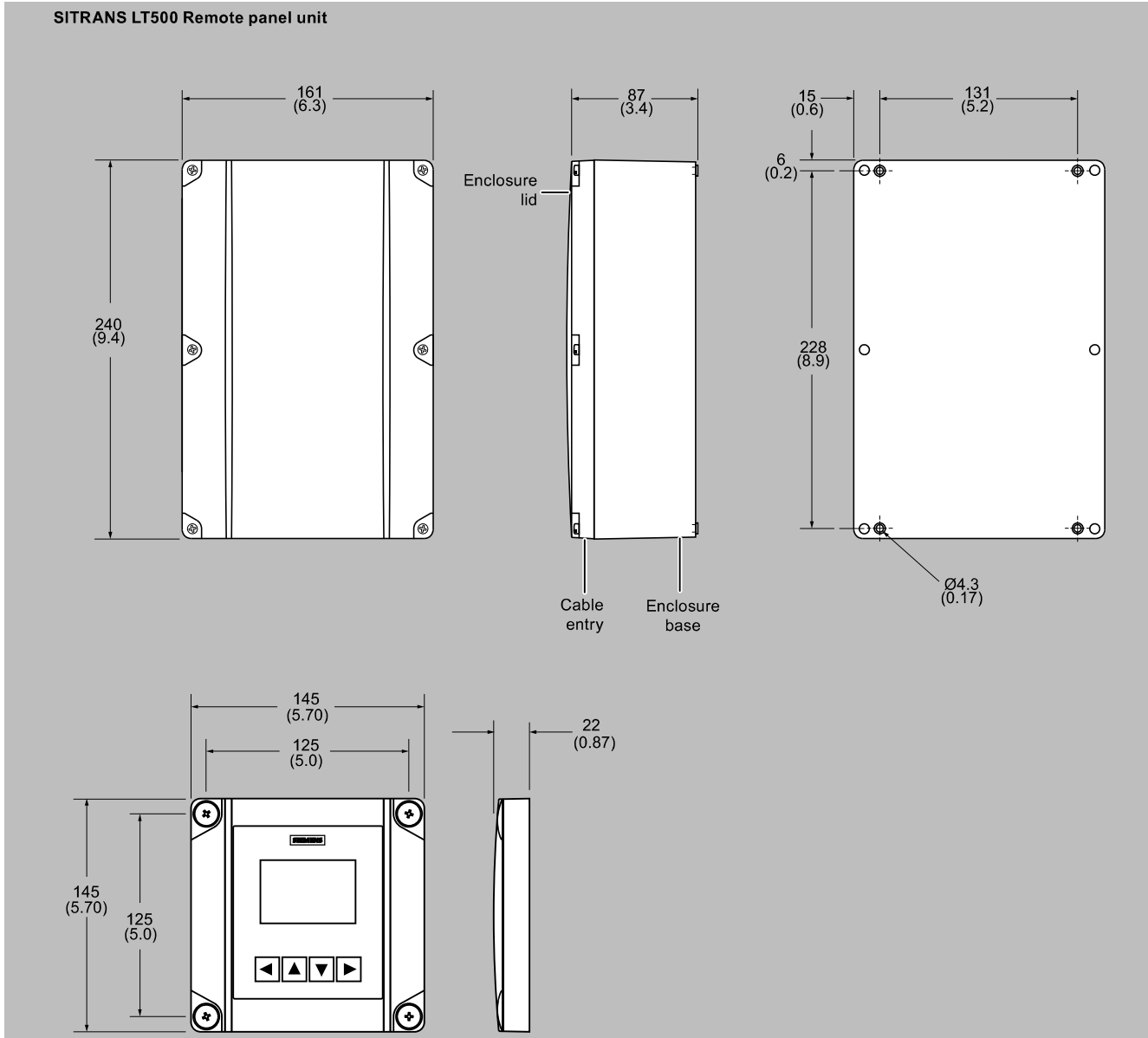
Controllers / SITRANS LT500 - HydroRanger / MultiRanger

Dimensional drawings



SITRANS LT500, dimensions in mm (inch)

Dimensional drawings (continued)



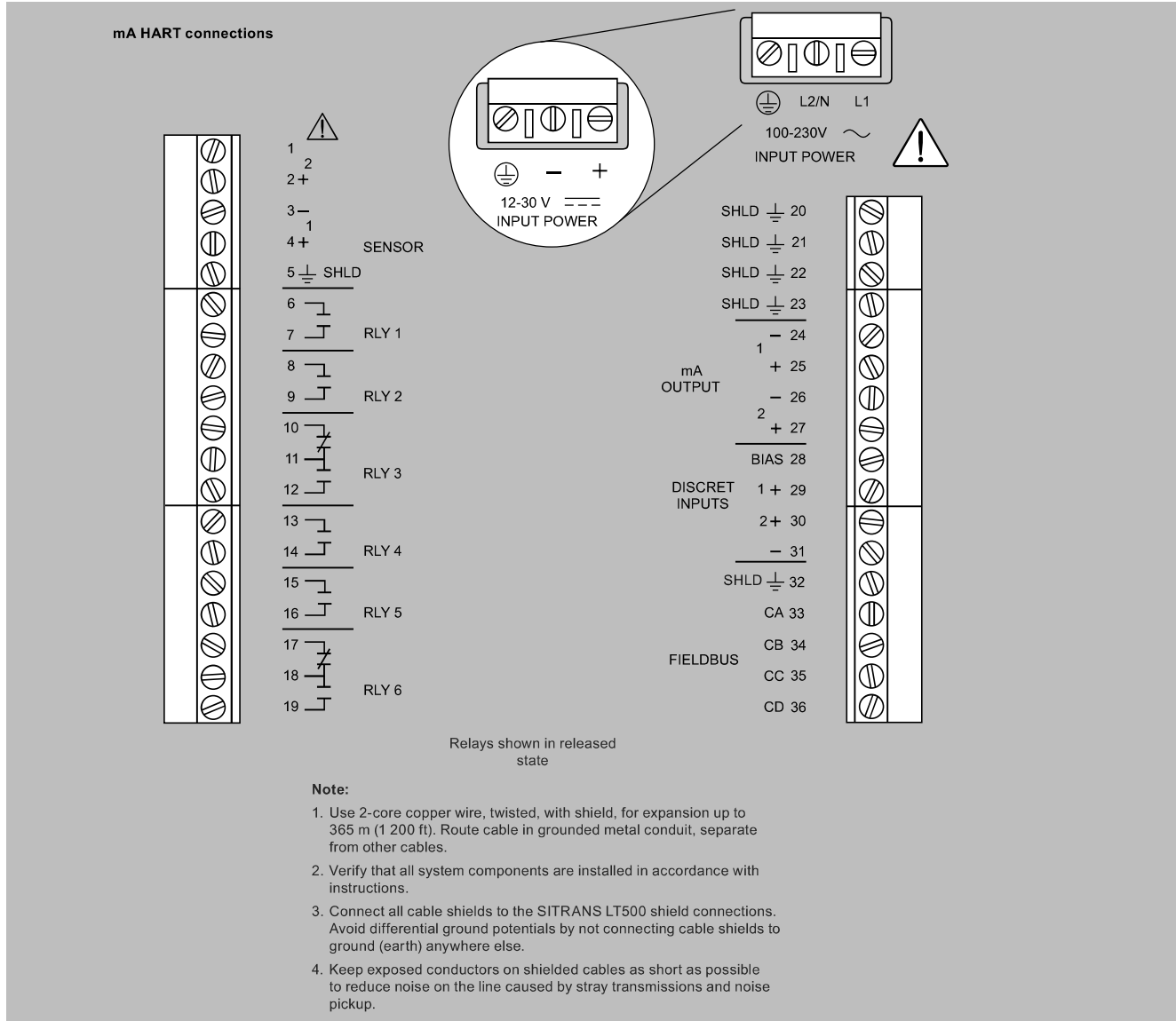
SITRANS LT500 Remote panel unit, dimensions in mm (inch)

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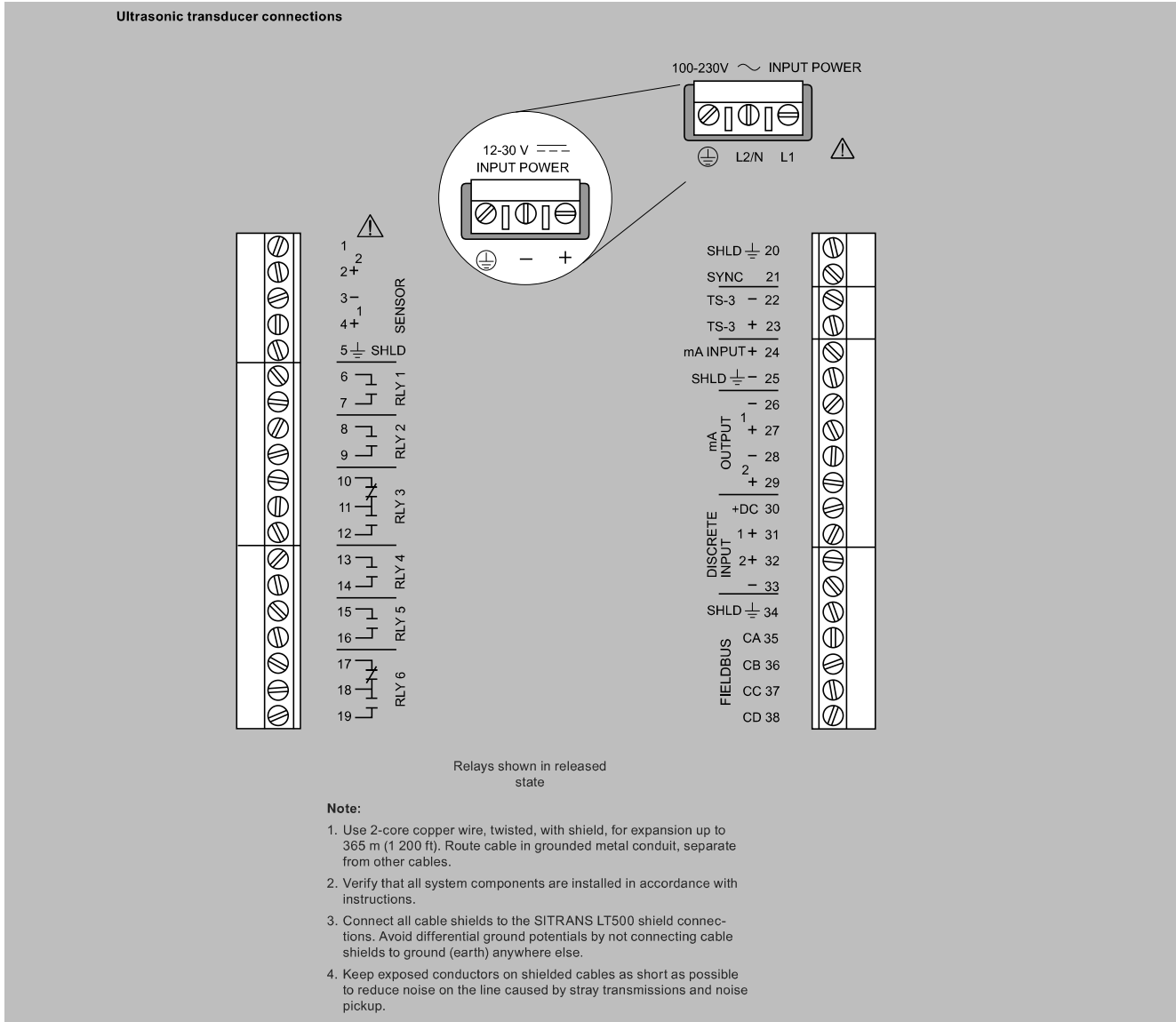
Controllers / SITRANS LT500 - HydroRanger / MultiRanger

Circuit diagrams



SITRANS LT500 mA HART connections

Circuit diagrams (continued)



SITRANS LT500 Ultrasonic transducer connections